CLAIMS

What is claimed is:

1. A method for reducing feature size in a thin film magnetic write head using low temperature deposition coating of photolithographically-defined trenches, comprising the steps of:

forming a base layer;

applying a plating seed layer over said base layer;

applying a photoresist layer over said plating seed layer to a desired thickness;

defining a trench in said photoresist layer that exposes said plating seed layer, said trench having substantially vertical side walls and a bottom defined by said plating seed layer;

depositing an insulative spacer layer using a low temperature chemical vapor deposition process to cover said trench side walls;

anisotropically etching horizontal portions of said spacer layer to remove spacer layer material from said trench bottom to expose said plating seed layer while leaving intact vertical portions of said spacer layer that cover said trench side walls, thereby defining a narrowed trench;

electroplating metallic material onto said plating seed layer to form a structure in said narrowed trench;

stripping away said photoresist layer; and

stripping away said spacer layer vertical portions;

whereby a structure of reduced feature size is formed.

2. A method in accordance with Claim 1 wherein said feature is a pole piece or a coil.

3. A method in accordance with Claim 1 wherein said spacer layer comprises a material from the group consisting of semiconductors, metal oxides and metal nitrides.

4. A method in accordance with Claim 1 wherein said spacer layer comprises a material from the group consisting of including tantalum oxide, silicon dioxide and silicon nitride.

5. A method in accordance with Claim 1 wherein said chemical vapor deposition process is an atomic layer chemical vapor deposition process.

6. A method in accordance with Claim 1 wherein said spacer layer is deposited at a thickness of up to about 200 nm.

7. A method in accordance with Claim 1 wherein said chemical vapor deposition process is performed at a temperature that does not cause deformation of said trench defined in said photoresist layer.

8. A method in accordance with Claim 1 wherein said chemical vapor deposition process is performed without exceeding a temperature of about 120° Celsius.

9. A method in accordance with Claim 1 wherein said write head is part of an integrated read/write head having a thin film read sensor, and said chemical vapor deposition process is performed without exceeding a temperature that could cause degradation of material layers in said read sensor.

10. A method in accordance with Claim 1 wherein said photoresist layer and said spacer layer vertical portions are stripped away in a single step.

11. A magnetic recording transducer, said transducer having a thin film magnetic write head of reduced feature size formed by a process that comprises the steps of:

forming a base layer;

applying a plating seed layer over said base layer;

applying a photoresist layer over said plating seed layer to a desired thickness;

defining a trench in said photoresist layer that exposes said plating seed layer, said trench having substantially vertical side walls and a bottom defined by said plating seed layer;

depositing an insulative spacer layer using a low temperature chemical vapor deposition process to cover said trench side walls;

anisotropically etching horizontal portions of said spacer layer to remove spacer layer material from said trench bottom to expose said plating seed layer while leaving intact vertical portions of said spacer layer that cover said trench side walls, thereby defining a narrowed trench;

electroplating a metallic material onto said plating seed layer to form a structure in said narrowed trench;

stripping away said photoresist layer; and

stripping away said spacer layer vertical portions;

whereby a structure of reduced feature size is formed.

12. A transducer in accordance with Claim 11 wherein said pole piece is a pole piece or a coil.

13. A transducer in accordance with Claim 11 wherein said spacer layer comprises a material from the group consisting of semiconductors, metal oxides and metal nitrides.

14. A transducer in accordance with Claim 11 wherein said spacer layer comprises a material from the group consisting of tantalum oxide, silicon dioxide and silicon nitride.

15. A transducer in accordance with Claim 11 wherein said chemical vapor deposition process is an atomic layer chemical vapor deposition process.

16. A transducer in accordance with Claim 11 wherein said spacer layer is deposited at a thickness of up to about 200 nm.

17. A transducer in accordance with Claim 11 wherein said chemical vapor deposition process is performed at a temperature that does not cause deformation of said trench defined in said photoresist layer.

18. A transducer in accordance with Claim 11 wherein said chemical vapor deposition process is performed without exceeding a temperature of about 120° Celsius.

19. A transducer in accordance with Claim 11 wherein said write head is part of an integrated read/write head having a thin film read sensor, and wherein said chemical vapor deposition process is performed without exceeding a temperature that could cause degradation of material layers in said read sensor.

20. A transducer in accordance with Claim 11 wherein said photoresist layer and said spacer layer vertical portions are stripped away in a single step.

21. In a disk drive having a housing, a rotatable magnetic recording medium in the housing, an actuator carrying an actuator arm, a suspension, and a read/write head disposed in

adjacent relationship with the recording medium, an improved thin film magnetic write head having reduced feature size formed by a process that comprises the steps of:

forming a base layer;

applying a plating seed layer over said base layer;

applying a photoresist layer over said plating seed layer to a desired thickness;

defining a trench in said photoresist layer that exposes said plating seed layer, said trench having substantially vertical side walls and a bottom defined by said plating seed layer;

depositing an insulative spacer layer using a low temperature chemical vapor deposition process to cover said trench side walls;

anisotropically etching horizontal portions of said spacer layer to remove spacer layer material from said trench bottom to expose said plating seed layer while leaving intact vertical portions of said spacer layer that cover said trench side walls, thereby defining a narrowed trench;

electroplating a metallic material onto said plating seed layer to form a structure in said narrowed trench;

stripping away said photoresist layer; and

stripping away said spacer layer vertical portions;

whereby a structure of reduced track width feature size is formed.

22. A disk drive in accordance with Claim 21 wherein said pole piece is a pole piece or a coil.

23. A disk drive in accordance with Claim 21 wherein said spacer layer comprises a material from the group consisting of semiconductors, metal oxides and metal nitrides.

24. A disk drive in accordance with Claim 21 wherein said spacer layer comprises a material from the group consisting of tantalum oxide, silicon dioxide and silicon nitride.

25. A disk drive in accordance with Claim 21 wherein said chemical vapor deposition process is an atomic layer chemical vapor deposition process.

26. A disk drive in accordance with Claim 21 wherein said spacer layer is deposited at a thickness of up to about 200 nm.

27. A disk drive in accordance with Claim 21 wherein said chemical vapor deposition process is performed at a temperature that does not cause deformation of said trench defined in said photoresist layer.

28. A disk drive in accordance with Claim 21 wherein said chemical vapor deposition process is performed without exceeding a temperature of about 120° Celsius.

29. A disk drive in accordance with Claim 21 wherein said write head is part of an integrated read/write head having a thin film read sensor, and wherein said chemical vapor

deposition process is performed without exceeding a temperature that could cause degradation of material layers in said read sensor.

30. A disk drive in accordance with Claim 21 wherein said photoresist layer and said spacer layer vertical portions are stripped away in a single step.